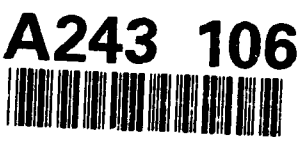

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SOURCES AND CONSEQUENCES OF INTRINSIC TASK MOTIVATION IN ENGINEERS AT THE NAVAL AVIONICS CENTER

by

Steven S. Sutz

December, 1991

Co-Thesis Advisors: Kenneth W. Thomas
Gail F. Thomas

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This thesis examines the sources and consequences of intrinsic task motivation in civilian engineers. Using Thomas/Velthouse's model, intrinsic task motivation is measured in terms of four rewards that workers get directly from their work tasks: 1) Impact or the sense that one is accomplishing task goals, 2) Competence or performing task activities skillfully, 3) Meaningfulness or the value of the task purpose to the individual, and 4) Choice or one's ability to choose how to do the task.

The analysis is based on data from 372 engineers at the Naval Avionics Center in Indianapolis. Results of the analysis show that the amount of intrinsic task motivation that an engineer feels is strongly related to variables with significant financial implications for the organization, including professional development, stress symptoms, and intention to leave the job. Further, an engineer's "interpretive styles," his/her manager's behavior, and aspects of workgroup climate were shown to influence the engineer's intrinsic task motivation. Implications regarding management development programs, performance appraisals, and other activities are discussed.

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Sources and Consequences of Intrinsic Task Motivation in
Engineers at the Naval Avionics Center

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Submitted in partial fulfillment
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ABSTRACT

This thesis examines the sources and consequences of intrinsic task motivation in civilian engineers. Using Thomas/Velthouse's model, intrinsic task motivation is measured in terms of four rewards that workers get directly from their work tasks: 1) Impact or the sense that one is accomplishing task goals, 2) Competence or performing task activities skillfully, 3) Meaningfulness or the value of the task purpose to the individual, and 4) Choice or one's ability to choose how to do the task.

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I. INTRODUCTION

A. BACKGROUND

Major changes in management philosophy are occurring within the Department of Defense (DOD) and the Department of the Navy (DON). As Admiral Kelso, CNO, stated recently:

> I want us to structure a quietly effective effort to improve quality in the Navy which makes sense to our people, helps them get the job done properly, and helps us all manage our resources better. (Kelso, 1991, p.30)

Particularly considering the reduced fiscal environment the DOD faces and the reduced number of personnel, emphasis on quality in the workforce is paramount.

The Total Quality Management (TQM) program recently instituted throughout the DOD is an attempt to meet these challenges. This program, based on Dr. W. Edwards Deming's methods, has had stunning success in Japan over the past four decades. The bottom line implications of this approach has not escaped corporate America, much of which has recently implemented a TQM program.

A key portion of the TQM program, as espoused in the CNO's fourteen points (based on Deming), is the empowerment of the worker. This empowerment is a basic building block to the new management philosophy. Generally speaking, empowerment involves a movement away from a philosophy of management based

on controlling workers through the imposition of tight controls on worker activities and the use of contingent rewards and punishments to insure compliance (Block, 1987). In its place, empowerment involves granting workers more autonomy, relaxing controls, and relying more heavily upon workers to control their own activities to achieve quality work.

In turn, the key motivational basis for empowerment is the intrinsic task motivation of workers--roughly speaking, the rewards that workers get directly from performing quality work (Thomas/Velthouse, 1990). Thus, TQM and empowerment require us to move away from the "carrot and stick" approach and to be more concerned with people genuinely caring about the quality of their work. Such aspects of TQM as creating an "atmosphere of trust and open communication where everyone shares a sense of pride in their work", driving "fear out of the work place" (Phillips, 1991, p.29) and stressing education and self-improvement emphasize the importance of intrinsic motivation as a key ingredient in improving the quality of the workforce.

Because intrinsic task motivation is of interest to DOD due to quality and financial considerations, this thesis looks at and attempts to add to the literature regarding the nature and enhancement of intrinsic motivation. Research on this subject is limited. Two models, discussed later, have focused somewhat narrowly on the role of reward systems and job design. However, these and other models leave out many other

variables that shape intrinsic task motivation in organizations, such as leadership, workgroup climate, and individual thought processes. One promising new model by Thomas and Velthouse builds on the earlier models and is more comprehensive in the elements that shape intrinsic task motivation.

B. OBJECTIVE AND RESEARCH QUESTION

1. Objective

As stated above, this thesis will attempt to add to the literature regarding the nature and enhancement of intrinsic motivation. Specifically, it will apply the Thomas/Velthouse model to the engineering departments of a large DOD organization currently implementing TQM. This thesis is a follow-up to a previous thesis by Chang and Quick (1991), which collected data for this intrinsic task motivation analysis. Their focus, however, was on identifying skills of effective managers. This thesis will analyze intrinsic task motivation in much greater detail.

2. Research Question

The primary research question of this study is the following:

- What are the sources and consequences of intrinsic task motivation in engineers at the Naval Avionics Center?

The usefulness of this study is that it will enable us to learn how to better manage and build intrinsic task motivation in DOD workers. As a subsidiary goal, it will assess the usefulness of the Thomas/Velthouse model in describing and explaining intrinsic task motivation.

C. ORGANIZATION OF STUDY

Chapter II will review the literature regarding the nature and enhancement of intrinsic task motivation. Chapter III will discuss the methodology employed in this study. Chapter IV will provide an analysis of the results of the study. Chapter V will furnish the general conclusions of the study, discuss implications for NAC, and provide recommendations for further study.

II. LITERATURE REVIEW

This chapter begins by defining intrinsic task motivation and differentiating it from extrinsic motivation. Models of intrinsic motivation are then discussed, with the Thomas/Velthouse model being highlighted. Finally, what this study will attempt to add to the literature will be discussed. Much of the review in this chapter is based on information found in Tymon (1988).

A. DEFINITIONS OF INTRINSIC MOTIVATION

Intrinsic motivation is a type of motivation. Tymon (1988, p.13) has summarized social scientists' definitions of motivation by stating that:

> Motivation...can be viewed as involving those psychological processes which control the arousal, direction, and persistence of voluntary, goal directed actions.

Among the various types of motivation, intrinsic work motivation involves positively valued experiences (i.e., intrinsic work outcomes) associated directly with task behavior. (Tymon, 1988, p.14)

Intrinsic work motivation can be contrasted with extrinsic work motivation. Whereas intrinsic motivation is based on positively or negatively valued experiences that come directly

from performing work, extrinsic work motivation depends upon positive or negative outcomes that are external to the task and are controlled by someone else (usually a manager), such as salary, bonus, better office, recognition, reprimand, etc.

Like Thomas and Velthouse, this thesis uses the term intrinsic task motivation. Intrinsic task motivation is similar to intrinsic work motivation except that the focus is on individual tasks or projects. A task can be defined as a "set of activities directed towards a purpose" (Thomas & Velthouse, 1990, p.668).

B. MODELS OF INTRINSIC MOTIVATION

In this section I will review three prominent models of intrinsic motivation. While not attempting to describe the models in their entirety, I will focus on:

- The rewards directly associated with the task that each model says intrinsic motivation is based on;
- The variables that determine these rewards (their causes), and
- The outcomes of intrinsic motivation.

1. Deci and Ryan's Theory of Intrinsic Motivation

Deci and Ryan's theory of intrinsic task motivation builds on original work by Deci (1975). Their model has been cited frequently in the social psychology literature.

However, the shortcoming of much of this research is its reliance on games and puzzles in laboratory experiments, rather than field research in actual work organizations.

a. Rewards

Deci and Ryan (1985) approach intrinsic motivation based on one's need to feel competent and self-determining, which is viewed as a driving force in motivating one to seek and attempt to conquer challenges. According to Deci and Ryan, then, these internal feelings of competence and self-determination are the rewards associated with the behavior (Tymon, 1988, p.26).

b. Causes

According to Deci and Ryan, intrinsic motivation is not based solely on the objective characteristics of an external event, but instead is based on the psychological meaning that an event carries for an individual. The part of their model that they refer to as cognitive evaluation theory asserts that events can have one of three "functional significances" (i.e., psychological meanings) for intrinsic motivation: they can be informational (facilitating intrinsic motivation), controlling (restricting feelings of self-determination), or amotivating (reducing feelings of competence). In turn, the degree to which an event is perceived to have any of the three functional significances is

determined partly by aspects of the objective event and partly by an individual's causality orientation (Tymon, 1988).

With respect to events themselves, Lee (1987, p.18) notes that events that "facilitate self-determination and lead to an increase in perceived internal locus of causality" will tend to lead to increased intrinsic motivation. Further, intrinsic motivation can be enhanced by increasing one's perceived competence. This can be accomplished by one's successfully accomplishing an optimally challenging task and/or by receiving positive feedback. Much research on the Deci and Ryan model has focused on the role of feedback and extrinsic rewards.

Causality orientations are predispositions for individuals to interpret events in certain ways. There are three causality orientations: autonomy, control, and impersonal. An autonomy (or "choice") orientation involves the tendency to interpret environmental events as informational and to view one's behavior as self-initiated, thus increasing intrinsic motivation. A control orientation weakens intrinsic motivation through a tendency to experience events in terms of "pressure to perform and not experiencing a real sense of choice." (Tymon, 1988, p.28). An impersonal orientation diminishes intrinsic motivation through a tendency to perceive that "behavior and outcomes are independent", resulting in feeling "incompetent to deal with life's challenges." (Tymon, 1988, p.28).

c. Outcomes

According to Deci and Ryan (1985), intrinsic motivation leads to feelings of interest and enjoyment, as opposed to feelings of pressure and tension when one is not intrinsically motivated (Lee, 1987, p.8). They note that an intrinsically motivated person will persist in an activity during a period of not being supervised or monitored. Tymon (1988) indicates that Deci and Ryan also assert that greater creativity and more cognitive complexity result from intrinsic motivation.

2. Hackman and Oldham's Job Characteristics Model

Hackman and Oldham's framework focuses on job design which produces intrinsic work motivation. Their model is currently the most popular perspective on job design.

a. Rewards

According to the Hackman and Oldham (1980) model, the rewards derived from work are the positive feelings associated with the task itself (Lee, 1987). The model is not specific about the nature of these rewards.

b. Causes

The task or job characteristics in Hackman and Oldham's model are: skill variety, task identity, task significance, autonomy, and feedback. These job characteristics affect one's positive feelings by influencing three critical psychological states. These states are:

caring about an activity (experienced meaningfulness from the work), feeling personally accountable for outcomes (experienced responsibility for results), and learning about the results of one's efforts (knowledge of results) (Lee, 1987).

The Hackman and Oldham job characteristics model also identifies three moderators that affect how strongly job design results in the psychological states and outcomes: knowledge and skill, growth need strength and context satisfactions. Subsequent research, however, has been inconclusive as to the moderators effect on either the strength of experiencing the psychological states or on the subsequent internal motivation (Tymon, 1978).

c. Outcomes

According to the Hackman and Oldham model, intrinsic motivation results in increased satisfaction and performance, and decreased absenteeism and turnover rates (Lee, 1987).

3. Thomas/Velthouse "Interpretive" Model of Intrinsic Task Motivation

The Thomas/Velthouse model of intrinsic task motivation is the framework used for this thesis. Their model builds on the work of Deci and Ryan and on Hackman and Oldham's model of intrinsic task motivation. It is designed

specifically to apply to work situations and incorporates a wide range of causal variables.

a. Rewards

According to the Thomas/Velthouse model of intrinsic task motivation, the rewards involved in intrinsic task motivation consist of four positively valued "task assessments" that an individual can make about a task (Thomas and Velthouse, 1990). These task assessments deal with impact, competence, meaningfulness, and choice. Impact is described as the "degree to which behavior is seen as 'making a difference' in terms of accomplishing the purpose of the task." (Thomas/Velthouse, 1990, p.672). Competence is defined as "the degree to which a person can perform task activities skillfully when he or she tries" (Thomas/ Velthouse, 1990, p.672). Meaningfulness "concerns the value of the task goal or purpose, judged in relation to the individual's own ideals or standards" (Thomas/Velthouse, 1990, p.672). Finally, choice is described in the Thomas/Velthouse model as the degree to which one sees oneself as freely choosing one's task behavior, as opposed to being constrained or forced to perform the behavior by external events.

b. Causes

Like the Deci and Ryan model, the Thomas/Velthouse model sees the task assessments as based upon interpretations

of external events. These interpretations are shaped by both relatively objective (factual) data received from external events and by the "interpretive styles" of the worker.

With respect to external events, Thomas and Velthouse note that data regarding the task assessments are drawn from a wide variety of sources. This includes the variables in the preceding models--reward and feedback systems, job characteristics--but is not limited to them. Other sources include leadership styles, work group and organizational culture, and training. Thus, the Thomas/Velthouse model allows for a more comprehensive set of external causal variables.

The task assessments are also influenced by three interpretive processes engaged in by individuals: evaluating, attributing, and envisioning. These interpretive processes "add meaning to factual perceptions about tasks" by providing "task-related cognitions about how well things are going, about what may have caused past events, and about what could happen in the future" (Thomas and Velthouse, 1990, p.669).

As will be discussed later, Thomas and Velthouse also postulate that there are individual differences in interpretive processes, called interpretive styles. These interpretive styles are predicted to skew worker's interpretations of task events and therefore to influence their task assessments (and intrinsic motivation). Unlike the "causality orientations" in the Deci and Ryan model,

interpretive styles are believed to be changeable through training. Thus, the Thomas/Velthouse model provides an additional route to worker empowerment through "self-empowerment training" in interpretive styles.

c. Outcomes

According to the original Thomas/Velthouse model, there are five behavioral outcomes associated with increased intrinsic motivation. These outcomes are increased activity, concentration, initiative, resiliency and flexibility (Thomas/Velthouse, 1990, p.670).

4. Further Testing and Refinement of the Thomas/Velthouse Model

Tymon (1988) tested and further refined the Thomas/Velthouse model in a study of professional workers in three organizations, 1) a major metropolitan research hospital, 2) an electronics firm, and 3) a computer services firm. As part of this study, he developed reliable measures of the task assessments and interpretive styles.

Tymon verified that the four task assessments were distinct. He also found there were three interpretive styles that were related to the three interpretive processes, but in a more complex way than expected. He called these styles deficiency focusing, skill recognition, and envisioning success. Deficiency focusing cuts across all three interpretive processes (evaluating, attributing, and

envisioning) and involves a tendency to focus on what's wrong or may go wrong. People who score high in deficiency focusing focus on what's wrong when they are going through the interpretive process of evaluating, think about what may go wrong when they are envisioning the future, and focus on what may be wrong with themselves when they are attributing the causes of setbacks. Skill recognition is a tendency for workers to attribute successes to their skill or competence. When individuals are successful, then, people high in skill recognition see it as evidence of their skill or competence. Finally, envisioning success is a tendency to have clear images of succeeding when envisioning the future.

Tymon verified that a strong relationship exists between the interpretive styles and the task assessments. That is, workers' interpretive styles were found to strongly influence their task assessments and, therefore, their intrinsic motivation. In addition, Tymon verified relationships between the task assessments and three outcome variables that he added to the model: job satisfaction, stress, and performance. He found that the task assessments were strongly related to job satisfaction, moderately related to stress, and more modestly related to job performance.

Finally, Tymon also found that the interpretive styles, especially deficiency focusing, were more strongly related to stress than the model predicted. That is, the interpretive styles had strong direct effects upon stress

rather than simply influencing stress through their effects upon the task assessments.

In a subsequent, unpublished study, Thomas and Tymon (1990) further refined the measures of task assessments and interpretive styles and, with those improved measures, replicated the results of the Tymon (1988) study. The Thomas and Tymon study used 142 part-time MBA students, who were working in a variety of organizations.

As part of that research, Thomas and Tymon identified a fourth interpretive style that was related to stress, which they called necessitating. Although necessitating proved to have a strong affect on stress, it was not viewed as a significant contributor to the task assessments, and thus will not be included in this thesis. (For a discussion of necessitating and other interpretive styles most directly related to stress, see Thomas and Tymons' forthcoming Stress Resiliency Profile. For a study of how the interpretive styles relate to communication apprehension, see Williams (1991) and Thomas, Thomas and Williams (1991).

C. MODEL USED IN THIS STUDY

This study will test the Thomas/Velthouse model on engineers in a DOD context to see if it explains intrinsic motivation. Previous studies have used professional workers, but not specifically engineers, nor in a DOD context. As Chang and Quick summarize (1991), intrinsic task motivation is

believed to be especially important to engineers. Engineers tend to be high achievers. Badawy (1978, p.41) suggested that "engineers place greater value on the psychological meaningfulness of their work rather than the economic significance." In Thamhain's (1983) hierarchy study of specific professional needs expressed by engineering personnel, the top three needs all had to do with intrinsic task motivation:

- strong needs for interesting and challenging work
- strong needs for a professionally stimulating environment, which is one that will fulfill the engineers' esteem needs through recognition, pride and involvement
- strong needs for professional growth, which consists of promotions, salary growth, increased expertise and professional recognition.

Thus, it appears that strategies for increasing intrinsic task motivation would be especially advantageous in the management of engineers.

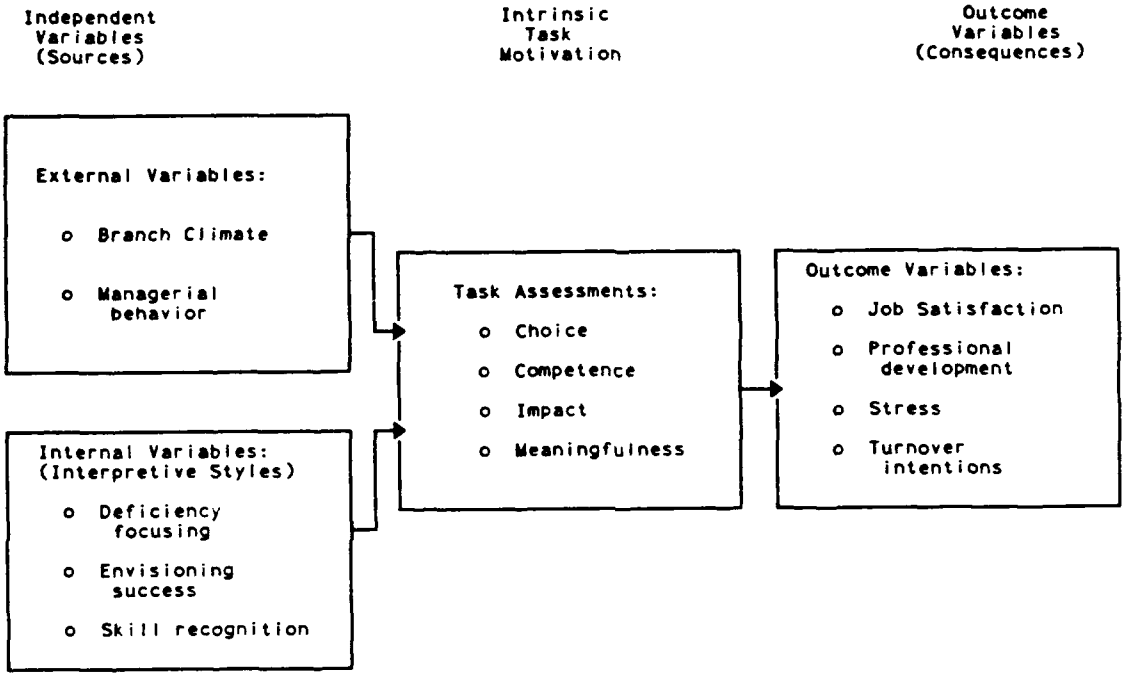
The specific variables to be investigated are shown in Figure 2.1, along with expected relationships between them. Earlier it was stated that the Thomas/Velthouse model predicts that various external variables affect an individual's task assessments. However, research on this model to date has focused entirely on the causal role of the interpretive styles. This study will begin to investigate the effects of

external variables upon the task assessments by looking at two important sets of external variables involving managerial behavior and work group climate. These are important variables over which engineering managers have some control.

Further, this study will add two new outcome variables to the Thomas/Velthouse model--turnover intentions and professional development. Turnover intention is an important variable in that it has bottom line financial implications for the organization: these implications include the loss of valued human resources in which the organization has invested training and other resources, as well as the costs of recruiting and hiring replacement engineers. (For discussion of the costs of engineering turnover, see Roberts, Thomas and Davis, (1990). Similarly, professional development has financial implications for the organization as a measure of the increased value of its human resources.

FIGURE 2.1

MODEL OF INTRINSIC TASK MOTIVATION TO BE INVESTIGATED IN THIS STUDY, SHOWING VARIABLES AND THEIR RELATIONSHIPS



III. METHODOLOGY

A. BACKGROUND

Data for this study were collected as part of a larger study of effective engineering managers at the Naval Avionics Center (NAC). For a more complete description of that organization, the design of the overall study, and an analysis of portions of that data related to management skills, see Chang and Quick (1991). This study is a more detailed analysis of those portions of the data related to intrinsic task motivation.

B. SUBJECTS

The subjects participating in this study were 372 engineers who were members of 48 engineering branches in NAC. The engineer were a relatively homogeneous population in that they performed similar project engineering work. (Chang and Quick, 1991, p.28).

C. QUESTIONNAIRE

The data reported in this study were collected using a questionnaire. (The full questionnaire is included as Appendix A). The questionnaire was organized into five sections, as follows:

- **Background Information** - This section included 11 questions dealing with personal data on the engineer and the nature of his or her job.

- **Managerial Behavior** - This section contained 67 questions involving engineers' ratings of various aspects of their branch manager's behavior, including "three questions to assess the engineers' general ratings of their manager's overall effectiveness." (Chang and Quick, 1991, p.30) As discussed in Chapter II, managerial behavior is considered a key external environmental variable influencing task assessments in this study.

- **Branch Climate** - This section included 30 questions dealing with the atmosphere and cooperativeness within the branch. Again, the impact of this external environmental variable upon the task assessments will be examined in this study.

- **Feelings About Work** - This section contained 44 questions concerning the individuals' feelings and intentions. Included were questions measuring the four task assessments and the four outcome variables of job satisfaction, stress, turnover intentions, and professional development.

- **Ways of Thinking** - This section included 26 questions dealing with the engineer's interpretive styles, the internal independent variables in this study.

For a general discussion of the origin of the questionnaire items, see Chang and Quick (1991). More specifically, the measures of the task assessments and interpretive styles were those developed by Thomas and Tymon and are used here with their permission.

D. QUESTIONNAIRE DISTRIBUTION

The questionnaires were distributed by the Civilian Personnel Department and were completely confidential. Of 556 questionnaires distributed to the engineers and scientists, 389 were returned, representing a 69% response rate. Of this total, four questionnaires were not adequately completed and were deleted from the analysis.

E. STATISTICAL DATA ANALYSIS

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) software package. Engineer/scientist questionnaire data were consolidated into a data file for each branch. Files were created for each branch that had at least two engineers who responded for that branch. Engineers must also have worked at least one month in that branch to be included in the file. This consolidation yielded a file of 48 branches, which included 372 engineers/scientists.

Specific analysis and results for correlations between the task assessments, outcome variables, and independent variables will be presented in Chapter IV.

IV. RESULTS

This chapter will look at the four task assessments, their relation to the outcome variables, and finally their relations to the independent (causal) variables.

A. TASK ASSESSMENTS

This analysis begins by focusing on the four task assessments--the key components of intrinsic task motivation according to the Thomas/Velthouse model.

First, a factor analysis was performed on the 24 questions intended to measure the four task assessments. To save space the details of this analysis will not be reported here. However, the factor analysis confirmed the existence of four distinct factors, corresponding to choice, competence, impact, and meaningfulness. These results replicated the results of previous studies by Tymon (1988) and Thomas and Tymon (1990). This group of engineers, then, perceived these four task assessments as distinct aspects of task-related rewards.

Next, scores for each engineer were calculated on each task assessment. Three of the task assessment questions did not load on the predicted variables and were deleted from further analysis. Individual scores for the four task assessments were calculated by averaging each score on the remaining items for each of the four task assessments. An

overall measure of intrinsic task motivation was also calculated by averaging the scaled scores of the four task assessments.

Table 4.1 shows the mean scores for the four task assessments, together with the standard deviations and internal consistencies (coefficient alpha) of the items measuring each task assessment. The alphas are moderately high for all four task assessments. These high internal consistencies indicate high reliability in the measures of the four task assessments. (See Appendix B for a list of the questions measuring the task assessments and other variables in this study. A complete table of means, standard deviations, and internal consistencies for scaled variables used in this study is shown in Appendix C.)

TABLE 4.1

MEANS, STANDARD DEVIATIONS, AND INTERNAL CONSISTENCIES FOR THE FOUR TASK ASSESSMENTS AND OVERALL INTRINSIC TASK MOTIVATION (n=372)

Task Assessments	Mean Score	STD DEV.	Internal Consistency (α)
CHOICE	5.20	1.09	.92
COMPETENCE	5.70	0.93	.94
IMPACT	5.04	1.13	.88
MEANINGFULNESS	5.40	1.16	.94
OVERALL ITM	5.34	0.89	.95

Note: Variables ranged on a scale from a low of 1 to a high of 7.

The results shown in Table 4.1 also indicate that on average the engineers in this sample see themselves as having moderately high levels of the four task assessments. The mean score on overall intrinsic task motivation is 5.34 on a 7 point scale. Means for the individual task assessments range from 5.04 for impact to 5.70 for competence. The standard deviations, however, show that there is a fair amount of diversity in this feeling.

TABLE 4.2

INTERCORRELATIONS AMONG THE TASK ASSESSMENTS (n=372)

	CHOICE	COMPETENCE	IMPACT	MEANING-FULNESS
CHOICE		.46	.54	.54
COMPETENCE			.67	.58
IMPACT				.70
MEANINGFULNESS				

Note: All correlations shown are significant at $p \leq .001$, two tailed.

Table 4.2 shows the intercorrelations among the four task assessments. Even though these are distinct variables (that is, an individual can discriminate among them), Table 4.2 shows that they are still correlated with each other. This is to be expected, as these are all related components of intrinsic task motivation. For example, if little impact is made on achieving task goals, then it is expected over time that the task will lose meaningfulness, workers will not feel as competent at the task, and they will no longer freely choose to perform the task. (A complete list of all intercorrelations among the scaled variables in this study is shown in Appendix D.)

B. RELATIONS TO OUTCOME VARIABLES

Table 4.3 shows correlations between the task assessments and the outcome measures. All correlations in this table are

significant at the $p \leq .001$ level of statistical significance. That is, the chances of obtaining the correlations by chance alone are extremely slim.

TABLE 4.3

CORRELATIONS OF THE OUTCOME VARIABLES WITH THE TASK ASSESSMENTS (n=372)

OUTCOME VARIABLES	TASK ASSESSMENTS				OVERALL ITM
	CHOICE	COMPETENCE	IMPACT	MEANING-FULNESS	
JOB SATISFACTION	.54	.49	.69	.78	.76
PROFESSIONAL DEVELOPMENT	.56	.52	.66	.73	.75
STRESS SYMPTOMS	-.32	-.33	-.51	-.40	-.47
TURNOVER INTENTIONS	-.33	-.26	-.50	-.51	-.49

Note: All correlation coefficients are significant at $p \leq .001$, two tailed

Table 4.3 shows that in this group of engineers, overall intrinsic task motivation has especially strong positive correlations with job satisfaction and professional development (.76 and .75 respectively). Squaring these correlation coefficients shows that 58% of the variance in job satisfaction and 56% in professional development can be explained by one's intrinsic task motivation alone. This

seems to underscore the high importance of intrinsic task motivation to engineers which was discussed in Chapter II.

Table 4.3 also shows that overall intrinsic task motivation is also strongly negatively related to stress symptoms and turnover intentions (-.47 and -.49, respectively). These correlations are smaller in magnitude than for job satisfaction and stress, reflecting the fact that stress and turnover have broader sets of causes--some extending outside the organization. Nevertheless, these correlations still indicate that low intrinsic task motivation alone can explain 22% of the variance in engineers' stress symptoms and 24% of the variance in their intentions to leave the organization.

Of the four task assessments, impact and meaningfulness are generally more strongly correlated with the outcome variables than are choice and competence. As discussed in Chapter II, meaningfulness and impact are associated with the task purpose, referring to the value of that purpose and the degree to which it is being achieved, respectively. In contrast, choice and competence are more associated with task activities--with freely deciding on those activities and performing them skillfully, respectively. Although task activities and purposes both appear to be important to these engineers, then, their purposes seem to be somewhat more important sources of intrinsic rewards than the activities they perform to achieve those purposes.

This latter finding has a number of implications. First it reinforces the decision made by Thomas and Velthouse to include aspects of both task purpose and activities in their model. It also seriously questions the ability of Deci and Ryan's model to capture intrinsic motivation in work settings, since that model is based solely on task activities. Finally, it underscores the need for engineering managers to be especially concerned with providing their engineers with a sense that their task purposes are meaningful and that they are in fact making progress (impact) in achieving them.

It should be noted that the higher correlations between impact and meaningfulness and the outcome variables do not occur because these task assessments are more reliable than choice or competence. In fact, impact has the lowest internal consistency value, .88.

C. RELATIONS TO INDEPENDENT VARIABLES

1. Consistency Among Branch Members

The first analysis performed in trying to identify the sources of the task assessments was to determine whether engineers in a branch tend to have similar task assessments. If there is high agreement on task assessments within a branch, then it is likely that the causes will be common causes, that is, that there are things about the branch as a whole that are producing these task assessments. If, on the other hand, there is little or no consistency among the

members of the branch, then it is more likely that the sources will tend to be unique to the individual or his or her situation.

To answer this question, the degree of consistency of the task assessments within the branches was calculated, using the following procedure. First, using a computer program, the engineers in each branch were randomly divided into two halves, called the 'x' and 'y' groups, respectively. (This was only done for the forty branches from which we had data on at least four engineers.) The average scores on the task assessments were then calculated for the engineers in the 'x' group and in the 'y' group. Next, for each task assessment, correlations were calculated across the forty branches between the 'x' half's score and the 'y' half's score. This is equivalent to calculating a "split-half" reliability for the scores of the engineers on a given variable within branches. This procedure was followed twice, using two separate random "shuffles" of engineers into the 'x' and 'y' groups within each branch, to obtain two separate split-half correlation coefficients. Finally, the averages of the two split-half correlation coefficients were used to obtain the adjusted internal consistency coefficients (coefficient alpha) for a task assessment, using the Spearman-Brown Formula. This adjusted alpha is a measure of the internal consistency of the entire branches, including both the 'x' and 'y' halves on a

task assessment. For comparison purposes, these statistics were also calculated for other variables used in this study.

Table 4.4 shows the results of this analysis. The split-half correlation coefficients are shown for each of the two shuffles, followed by the adjusted alpha. We can see that there is a strong agreement between the split-half coefficients derived from the two shuffles. The mean difference across variables is only .02. Based on this high degree of agreement between the two shuffles, the split-half correlation coefficients, and hence the adjusted alphas, appear to be reliable estimates of the internal consistencies of these variables within branches.

TABLE 4.4

SPLIT-HALF RELIABILITY OF THE TASK ASSESSMENTS AND OTHER SCALED VARIABLES ACROSS INDIVIDUALS WITHIN A BRANCH (n=40 BRANCHES)

VARIABLES	RELIABILITIES		
	SPLIT-HALF I	SPLIT-HALF II	ADJUSTED α
1. TASK ASSESSMENTS			
MEANINGFULNESS	.33*	.36*	.51
COMPETENCE	.20	.18	.31
IMPACT	.10	.11	.19
CHOICE	.06	.06	.11
OVERALL ITM	.23	.23	.37
2. OUTCOME VARIABLES			
JOB SATISFACTION	.46**	.49**	.64
TURNOVER INTENTIONS	.23	.23	.37
STRESS	.01	.07	.07
PROFESSIONAL DEVELOPMENT	.27	.27	.44
3. SOURCE VARIABLES			
a) BRANCH LEVEL			
OVERALL MANAGERIAL EFFECTIVENESS	.74***	.73***	.85
GROUP PROBLEMS	.44**	.48**	.63
POSITIVE BRANCH CLIMATE	.32*	.32*	.48
PRESSURE IN BRANCH	.22	.23	.36
b) INTERPRETIVE STYLES			
DEFICIENCY FOCUSING	-.02	-.04	----
ENVISIONING SUCCESS	.30	.26	.44
SKILL RECOGNITION	.15	.15	.26

* $p \leq .05$, two tailed
** $p \leq .01$, two tailed
*** $p \leq .001$, two tailed

Scanning Table 4.4, it is clear that some variables show considerable commonality or agreement within branches, while others show much less agreement and are thus primarily individual phenomena. For example, the interpretive styles, which are assumed to be individual difference (personality) variables, show little agreement within branches--as one would expect. In contrast, engineers in a branch tend to show more agreement on questions about branch-level phenomena, namely managerial behavior and group climate. (Comparable statistics for the individual questions measuring engineers' perceptions of managerial behavior, contained in Appendix E, also tend to show relatively more agreement.)

Looking at the four task assessments, the split-half correlation coefficients are significant (at $p \leq .05$, two tailed) only for meaningfulness. In other words, there is a significant degree of agreement between the 'x' and 'y' groups of engineers in each branch only with respect to the meaningfulness of their work. We cannot say that there is significant agreement among the engineers in a branch concerning the other task assessments of competence, impact and choice, nor for overall intrinsic task motivation.

A possible explanation for branch agreement on the subject of meaningfulness might be that work meaningfulness is influenced by the nature of the branch's work, or perhaps that engineers in a branch talk about the meaningfulness of their work among each other, and have reached some consensus on this

issue. Another possible explanation is that some branch managers are more effective at convincing their engineers of the importance of their work goals.

The implication of this analysis with respect to the four task assessments is that these variables, with the exception of meaningfulness, are largely individual in nature. They are not generally produced by a common set of causes at the branch level, and they are largely influenced by factors that are different from engineer to engineer. For that reason, the rest of the analysis of the sources of intrinsic task motivation will be at the level of the individual engineer, rather than at the aggregate branch level.

2. Interpretive Styles

Since the preceding analysis has suggested that the sources of the task assessments are largely individual in nature, I will begin by looking at the individual interpretive styles.

Table 4.5 shows the correlation of interpretive styles with the task assessments and the overall intrinsic task motivation measure. Overall, the interpretive styles of envisioning success and skill recognition are somewhat more strongly related to the overall intrinsic task motivation measure than is deficiency focusing. Nevertheless, all three interpretive styles appear to make significant contributions to intrinsic task motivation.

TABLE 4.5

CORRELATIONS OF INTERPRETIVE STYLES WITH THE TASK ASSESSMENTS (n=372)

INTERPRETIVE STYLES	TASK ASSESSMENTS				OVERALL ITM
	CHOICE	COMPETENCE	IMPACT	MEANING-FULNESS	
DEFICIENCY FOCUSING	----	-.33	-.24	----	-.24
ENVISIONING SUCCESS	.26	.37	.32	.36	.42
SKILL RECOGNITION	.27	.54	.41	.34	.46

Note: Only correlations significant at $p \leq .001$, two tailed, are shown

Looking at differences among the columns in Table 4.5, it appears that skill recognition makes its largest contribution to the task assessment of competence, as one would expect. Skill recognition, as defined earlier, is the tendency to attribute one's successes to one's skills or competence--that is, to see successes as evidence of competence. It also appears that deficiency focusing has its strongest (negative) effects upon assessments of competence and impact. Note that both of these assessments are evaluations of how well one is doing things--how well one is performing task activities (competence) and how well one is progressing toward accomplishing the task purpose (impact). Thus, the tendency to focus on what is wrong appears most

likely to influence these evaluations. In contrast, envisioning success seems to have relatively equal correlations with all four task assessments.

3. Branch Climate

Now that personality (or individual difference) sources of task assessment influences have been examined, the analysis will turn to external influences on internal task motivation--group climate and managerial behavior.

In examining the relationships between the task assessments and these external phenomena, care was taken to avoid the artificially high correlations that would result from the "autocorrelation effect." Briefly, this effect occurs when the same individual rates two phenomena with good/bad overtones at the same time. Mood, or other influences, can similarly raise or lower the individual's ratings of both phenomena, thus producing artificially high correlations between the ratings. To avoid this danger, measures of branch climate and managerial behavior were formed by averaging the ratings of the engineers in a branch. These average ratings were considered a more valid and reliable measure of the "actual" value of these variables at the branch level by averaging out the results of individual engineers' perceptual biases. (Recall from the split-half reliability results in Table 4.4 that there was considerable agreement among engineers in a branch on these variables, a further

justification for combining engineers' ratings.) For each engineer in the study, then, correlations were calculated between these mean ratings of branch climate (or managerial behavior) and the engineer's own task assessments.

Table 4.6 shows the correlation of branch climate variables with the task assessments. Three climate variables were used in this analysis: positive climate, group problems, and pressure. "Positive climate" includes items which describe cooperation and supportive relations among branch members as well as confidence in the branch's ability to accomplish work. "Group problems" includes questions which indicate conflicts within the branch. "Pressure" includes a sense of urgency and other aspects of experienced pressure to accomplish the task.

It appears from Table 4.6 that pressure has no significant relationship with the four task assessments or intrinsic task motivation. The group problems variable has a negative correlation with overall intrinsic task motivation that is barely significant at the .001 level. With respect to the task assessments, the group problems variable is significantly related only to impact. From the viewpoint of intrinsic task motivation, then, the main effect of group problems (or conflict within a branch) seems to be that it is seen as interfering with the accomplishment of the task purpose.

TABLE 4.6

CORRELATION OF MEAN BRANCH CLIMATE VARIABLES WITH THE TASK ASSESSMENTS (n=365)

CLIMATE VARIABLES	TASK ASSESSMENTS				OVERALL ITM
	CHOICE	COMPETENCE	IMPACT	MEANING-FULNESS	
POSITIVE CLIMATE	.22	.18	.27	.21	.27
GROUP PROBLEMS	----	----	-.21	----	-.17
PRESSURE	----	----	----	----	----

Note: Only correlations significant at $p \leq .001$, two-tailed, are shown. Correlations reported are between an individual engineer's task assessments and the mean rating of the branch climate variables by all engineers in the branch. Only engineers in branches with four or more respondents are included.

In contrast, having a positive climate within the branch is somewhat more strongly correlated to overall intrinsic task motivation. Moreover, this variable appears to facilitate all four of the task assessments. It is likely that this variable is a measure of group morale. Group morale, in turn, may be roughly equivalent at the group level, to intrinsic task motivation at the individual level. That is, morale involves rewards which group members derive from being in the group. Our findings suggest that these rewards may parallel the task assessments in content and contribute to the individual task assessments of the group members. That is, group morale may include a sense of group choice,

competence, impact and meaningfulness, which helps contribute to each individual's own personal evaluation of his/her own standing on these task assessments.

4. Managerial Behavior

This analysis used two different ways to see how strongly managerial behavior was correlated with the task assessments. The first way was to look at the number (and content) of questions on managerial behavior that correlated with each of the task assessments. The general assumption, here, was that the greater the number of correlations for each task assessment, the more that task assessment is influenced by the manager's behavior. The second method was to look at a measure of the engineers' overall evaluation of their manager's effectiveness, and to see how strongly this measure correlated with the four task assessments and the overall intrinsic task motivation measure. The initial expectation was that these methods would show parallel results.

First, we begin by looking at individual questions on managerial behavior. The questions relating to managerial behavior were not collapsed into one score. Rather, they were treated as individual items. Table 4.7 shows the significant correlations of each managerial behavior question with the task assessments and with overall intrinsic task motivation (for $p \leq .001$). Only those items significantly correlated with at least one of these variables are shown. (For a complete

display of the correlation of task assessments with mean managerial behavior variables, please see APPENDIX F).

TABLE 4.7

CORRELATIONS OF TASK ASSESSMENTS
WITH MEAN MANAGERIAL BEHAVIOR VARIABLES

Question #	Question Description	Choice	Competence	Impact	Meaningfulness	Overall ITM
2	willing to take risks	0.23	--	--	--	0.19
5	shows how activities fit into overall mission	0.18	--	--	--	0.17
6	promotes teamwork	0.20	--	0.21	--	0.22
8	is a micro-manager	-0.17	--	--	--	--
9	sensitive to needs and desires	0.19	--	0.18	--	0.18
10	advises of task significance	0.23	--	0.19	--	0.22
11	looks for improved methods	0.17	--	--	--	--
13	encourages participation in decision making	0.21	--	0.17	--	0.21
14	stands up for subordinates	0.26	0.17	0.21	0.20	0.27
17	recommends promotions based on performance	0.23	--	0.18	0.19	0.23
18	guides subordinates' career development	0.20	--	0.21	0.18	0.22
19	keeps branch on schedule	0.21	0.18	0.21	--	0.24
20	shields branch from interruptions/hassles	0.25	0.18	0.23	0.17	0.26
21	conveys urgency about meeting deadlines	0.19	--	--	--	0.19
22	assigns tasks fairly, based on skills	0.23	0.18	0.23	0.19	0.27
23	encourages risk taking	0.26	--	0.19	--	0.24
24	listens to subordinates	0.18	--	--	--	0.19
25	career development based on performance	0.17	--	0.18	0.21	0.22
26	encourages new ways of quality improvement	0.20	--	0.20	--	0.21
29	recognizes superior performance	0.25	--	0.19	0.22	0.26
30	treats me with respect	0.24	0.19	0.21	0.19	0.26
31	informs branch of long-term goals	0.19	--	0.19	--	0.21
32	aggressive in task accomplishment	0.22	--	--	--	0.18
33	emphasizes intra-branch cooperation	0.19	--	0.17	--	0.19
34	looks for potential mistakes	-0.22	-0.19	-0.18	--	-0.23
35	provides inspiring ideas of possibilities	0.21	--	0.19	0.17	0.23
36	stresses meeting customers' needs	0.20	0.18	--	--	0.21
37	buffers between higher and adjacent units	0.20	0.18	--	--	0.21
38	pushes ahead in a positive manner	0.28	0.19	0.26	0.20	0.29
39	assigns work equitably	0.19	--	--	--	0.18
40	willing to admit mistakes	0.25	--	0.22	--	0.25
42	assigns desirable tasks due to performance	0.20	--	0.17	0.19	0.22
43	doesn't overdo guidance provided	0.17	--	--	--	0.17
44	sees mistakes as learning experiences	0.25	--	0.18	--	0.23
45	drops by to talk with me	0.21	--	0.21	--	0.21
49	provides direction for this branch	0.21	--	--	--	0.19
50	prioritizes task effectively	0.19	--	--	--	0.18
51	implements subordinates' ideas	0.19	--	--	--	0.18
52	informs of possible suprises/roadblocks	0.25	--	0.20	--	0.23
53	complains about what is wrong	0.17	--	--	--	0.18
56	has confidence in subordinates	0.21	--	0.17	--	0.21
57	provides helpful feedback	0.22	--	0.18	0.17	0.24
58	helps us develop ideas	0.20	--	0.17	--	0.21
59	works with others outside our branch	0.18	--	--	--	0.17
60	trusts subordinates	0.19	--	0.18	--	0.20
61	gives subordinates clear guidance	0.24	--	0.18	--	0.22
62	mostly tells us why things can't be done	-0.17	--	--	--	--
64	is an effective teacher	0.19	--	0.19	--	0.20
65	helps us feel good about our achievements	0.21	--	0.21	--	0.22
66	gives us credit for our successes	0.24	--	0.21	0.18	0.24
	Total # of items with significant correlations	50	9	33	13	47

Note: Only correlations significant at $p \leq .001$, two-tailed, are shown. Correlations reported are between an individual engineer's task assessments and the mean rating of the managerial behavior by all engineers in the branch. Only engineers in branches with four or more respondents are shown (n=365).

Scanning Table 4.7, it is clear that most of the items are significantly related to overall intrinsic task motivation. That is, it appears as though engineers' intrinsic task motivation is relatively responsive to managerial behavior. Looking at the four task assessments, it is also apparent that some appear more responsive to managerial behavior than others. Choice is most responsive, correlating with 50 of the managerial behavior questions at the $p \leq .001$. Impact is the next responsive, correlating with 33 of the managerial behavior questions. Meaningfulness and competence seem less responsive to managerial behavior, correlating with only 13 and 9 of those questions, respectively.

From this analysis, then, it appears that engineers see a very strong relationship between their branch manager's behavior and the amount of choice they experience. This is not surprising, since managerial style is often characterized in terms of a continuum involving this variable -- from autocratic/directive to more participative/delegative. Engineers see a somewhat weaker, but still moderately strong, relationship between their manager's behavior and their own impact. Thus it also appears that engineers see their manager as either significantly facilitating or hindering their attainment of work goals.

It is interesting that the manager's behavior is seen as being less strongly related to the meaningfulness of the

task and to competence. What this suggests with respect to competence, is that engineers are getting their sense of competence primarily from sources other than their manager. They may be getting this sense from their peers, for example, or inferring it themselves from their own work experience. With respect to meaningfulness, it appears that the engineers are drawing their conclusions primarily from a branch-level source other than the manager. (Recall from Table 4.4 that there is significant agreement among engineers within a branch on meaningfulness.) This source may be the nature of the branch work, their customers, or top management, for example.

Further information on how the branch managers may be influencing the intrinsic motivation of their engineers can be obtained from an examination of those managerial behavior items most strongly correlated with overall intrinsic task motivation. Table 4.8 shows the six questions that correlate most strongly with this measure. These items have to do with the manager running interference for the engineers (to help them achieve results, presumably) and making accurate personnel decisions (which allow engineers to achieve results or recognize their results). This analysis, although performed somewhat differently, further supports the findings of Chang and Quick (1991) that engineer intrinsic task motivation was related to the manager's skill at setting up and managing the branch as a system.

TABLE 4.8

MANAGERIAL BEHAVIOR QUESTIONS THAT CORRELATE MOST STRONGLY WITH OVERALL INTRINSIC TASK MOTIVATION (n=365)

	Managerial Behavior Questions	Correlation
Buffering and Protecting Branch		
37.	Runs interference for us in dealing with top management and other units.	.29
14.	Stands up for subordinates when it counts.	.27
20.	Protects the branch from unnecessary hassles and interruptions.	.26
Making Accurate Personnel Decisions		
22.	Assigns tasks and projects appropriately, based on subordinate's skills and limitations.	.27
29.	Gives recognition for superior performance.	.26
39.	Assigns work equitably.	.25

Next, the analysis turns to the second method of assessing the relationship between managerial behavior and the task assessments--involving engineer overall evaluation of their manager's effectiveness. As shown in Appendix B, this measure was formed by averaging the engineers' ratings on three items indicating the branch manager's overall effectiveness, satisfaction that he/she uses the right methods to get the job done, and overall satisfaction with the manager.

Table 4.9 shows the correlation of engineers' overall evaluation of their manager's effectiveness with the task assessments. This table shows that overall intrinsic task motivation, choice and impact do have significant correlation with this variable, with correlation values of .22, .24 and .20 respectively. Note that these findings parallel the results obtained from the analysis using individual questions on managerial behavior. That is, evaluation of the manager is most significantly related to the task assessments of choice and impact.

TABLE 4.9

CORRELATIONS BETWEEN THE TASK ASSESSMENTS AND MEAN RATINGS OF OVERALL MANAGERIAL EFFECTIVENESS

	TASK ASSESSMENTS				
	CHOICE	COMPETENCE	IMPACT	MEANING-FULNESS	OVERALL ITM
OVERALL EFFECTIVENESS OF MANAGER	.24	----	.20	----	.22

Note: Only correlations significant at $p \leq .001$, two-tailed, are shown. Correlations reported are between an individual engineer's task assessments and the mean rating of the manager's overall effectiveness by all engineers in the branch.

5. Other Independent Variables

As noted in Chapter III, the design of this study focused upon managerial behavior, branch climate, and interpretive styles as possible sources of the task assessments. However, some additional background information on individual engineers was also collected in Section I of the questionnaire. (Refer to Appendix A for these items.) Recall that the analysis in Table 4.4 suggested that the task assessments were predominately influenced by variables that were unique to individual engineers in a branch. For this reason, these background information questions were examined for possible relationships with the task assessments.

Tables 4.10 and 4.11 show those variables that were found to have a significant relationship with at least one of the task assessments. In previous analysis in this section, interpretive styles, branch climate and managerial behavior were strongly expected to influence the task assessments. Therefore a conservative test of statistical significance was used ($p \leq .001$). Here a broader net is being cast, and items were sought that might be relevant for further study. For this more exploratory additional analysis, therefore, the requirements have been relaxed somewhat, and relationships at the significance level of $p \leq .05$ are reported. In view of the small size of most of these relationships, however, the less

significant findings will only be shown. Only relationships significant at p≤.001 will be discussed.

TABLE 4.10

INDIVIDUAL SITUATION VARIABLES CORRELATED WITH TASK ASSESSMENTS (n=372)

INDIVIDUAL SITUATIONAL VARIABLES	TASK ASSESSMENTS				OVERALL ITM
	CHOICE	COMPETENCE	IMPACT	MEANING-FULNESS	
GS LEVEL	----	.14***	----	----	----
TENURE IN BRANCH	.14***	----	----	----	----
FREQ OF INTERACTION WITH BRANCH MGR	.26***	.10*	.14***	.15***	.20***
INTERDEPENDENCE WITH OTHER ENGRS IN BRANCH	----	.12*	----	.15***	----

* p≤.05, two tailed
** p≤.01, two tailed
*** p≤.001, two tailed

Table 4.10 contains significant correlations between the task assessments and four variables: GS level, length of time in branch, frequency of interaction with the branch manager, and interdependence with other engineers in the branch. (These correspond to questions #3, #4, #9 and #11 in Section 1 of the questionnaire, respectively.) Table 4.10 shows that at the p≤.001 level, only the engineer's frequency

of interaction with the branch manager has a significant correlaticn with the task assessment of choice and with overall intrinsic task motivation. This frequency of interaction with the boss may represent increased opportunity to influence the branch manager to authorize the engineer to do what one wishes to do, or to learn what options exist. Further, by interacting more with the manager, engineers may feel that they may receive more support from him or her when they do choose the tasks they work on.

TABLE 4.11

MEAN TASK ASSESSMENT SCORES FOR ENGINEERS WORKING ON DIFFERENT TYPES OF PROJECTS

PROJECT TYPE	TASK ASSESSMENTS				OVERALL ITM
	CHOICE	COMPETENCE	IMPACT	MEANING-FULNESS	
BASIC OR APPLIED RESEARCH (n=42)	5.14	5.78	5.18	5.38	5.37
DEVELOPMENT (n=188)	5.33^{+}	5.79	5.17^{+}	5.50	5.45
TECHNICAL SERVICE (n=131)	5.04^{-}	5.58	4.84^{-}	5.33	5.20

Note: In any column, + and - designate two project types which differ significantly ($p \leq .05$) in mean task assessment scores.

Table 4.11 shows the mean task assessment scores for engineers who reported working on different types of projects (Question #8 in Section 1 of the questionnaire). The

following procedure was used to identify significant differences between project types. First, a one-way analysis of variance was performed on each task assessment (and for overall intrinsic task motivation) to determine whether the project types explained a significant amount of variance in that score. Significant effects were found only for choice and impact. For these two task assessments, Fisher's "Least Significant Difference" test was used to identify those pairs of project types that were significantly different. For both choice and impact, the only significant difference occurred between development and technical service projects. As shown in Table 4.11, engineers working on development projects scored somewhat higher on both choice and impact than those working on technical service projects. However, these differences were barely significant at the $p \leq .05$ level.

V. CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY OF FINDINGS

This chapter will first summarize the major findings from Chapter IV, discussing the task assessments, their relations to outcome variables, and their relations to independent variables. Next, the implications for the Naval Avionics Center (NAC) will be discussed. The usefulness of the Thomas/Velthouse model in describing and explaining intrinsic task motivation will thenbe discussed. Finally, recommendations for further research will be provided.

1. Relation to Outcome Variables

The results of the analysis discussed in Chapter IV show that the amount of intrinsic task motivation an engineer feels is related to his or her job satisfaction, perception of professional development, intention to quit the job, and level of stress. This is consistent with that part of the literature review in Chapter II that stated that high levels of intrinsic task motivation are very important to engineers. In discussing the strength of relationships in this study, we will talk in terms of the proportion of variance in one variable that can be explained by another variable. This proportion can be obtained by squaring the correlation coefficient between the variables. In contrast with the

statistical significance of a relationship, this proportion is more indicative of the practical significance of the relationship--the size of one variable's potential effects on the other.

The data indicate that 58% of one's satisfaction with the job and 56% of one's perception of professional development can be explained by the level of one's intrinsic task motivation. Further, the data show that 24% of one's turnover intentions and 22% of one's feeling of stress can also be explained by the level of intrinsic task motivation. The size of these correlations may be inflated somewhat by autocorrelation effects. Nevertheless, it is clear from our results that intrinsic task motivation plays a major (and perhaps dominant) role in shaping many of these outcome measures for this sample of engineers.

2. Task Assessments

The analysis further showed that there are at least four distinct, although intercorrelated, task assessments that are components of intrinsic task motivation and are seen as rewards that engineers get from performing the task: a sense of choice, competence, impact, and meaningfulness. Of these four task assessments, impact and meaningfulness appear to be the most important to engineers, in the sense that these variables are more highly correlated with each of the outcome variables (job satisfaction, professional development, and

stress) than are choice and competence. Thus, it appears that finding ways to influence engineers' sense of impact and meaningfulness would prove the most beneficial in positively influencing the outcome variables. It is important to note, however, that the remaining two task assessments, choice and competence, are also moderately related to all four of the outcome variables.

3. Relation to Independent Variables

The analysis showed that there are distinct sets of influences upon intrinsic task motivation, with the strongest influence stemming from one's interpretive styles. Overall, 21% of one's intrinsic task motivation was explained by the interpretive style of skill recognition, while 18% was explained by one's style of envisioning success. Deficiency focusing explained only 6% of overall intrinsic task motivation.

Generally weaker relationships were discovered between the branch climate variables and intrinsic task motivation. Positive branch climate appeared to have the largest relationship of the branch climate variables, accounting for 7% of an engineer's intrinsic task motivation. Further, this variable is related to all four of the task assessments. Group problems accounted 3% of overall intrinsic task motivation, and was primarily negatively related to impact.

The influence of the branch manager's behavior upon intrinsic task motivation yielded consistent results across different analyses. Engineers' overall evaluation of their manager's effectiveness explained 5% of variance in intrinsic task motivation. Further, relationships were discovered between this variable and the task assessments of choice and impact. These relationships were corroborated by the preponderance of individual managerial behavior questions, which had significant correlations with the task assessments of choice and impact and with overall intrinsic task motivation. Examining those questions on managerial behavior that correlated most strongly with intrinsic task motivation supported the conclusion of Chang and Quick (1991, p.43). It appears that how well the manager "runs the branch system" by buffering it and making accurate personnel decisions serves to create the "enabling conditions" that allow engineers to get things done, deriving a sense of satisfaction from their work.

Regarding the individual situational variables that were added to the analysis, only the frequency of the engineer's interaction with the branch manager was significantly correlated at the $p \leq .001$ level with intrinsic task motivation, explaining 4% of the variance in this variable. However, this frequency of interaction explained 7% of the variance in choice.

B. IMPLICATIONS FOR THE NAVAL AVIONICS CENTER (NAC)

I will first discuss possible implications of these results for NAC, and then provide suggestions that they might enact to influence the outcome variables.

The results show that NAC engineers seem to care strongly about these intrinsic task rewards. That is, they want to be doing quality work (in terms of competence and achieving their goals) on meaningful projects in ways that they choose. Moreover, the extent that they experience these intrinsic task rewards is linked to important outcomes with financial implications for NAC. For example, intrinsic task motivation is linked very closely with professional development, which is a measure of the engineer's increasing value to NAC as a human resource. Moreover, low levels of intrinsic task motivation are related to stress symptoms and turnover intentions--which have obvious costs for NAC. Stress symptoms translate into lost work days, possible health care costs, and reduced effectiveness while at work. Turnover results in the loss of engineers that NAC has invested a great deal of training expense, together with the costs of reduced work effectiveness during the learning stages of the replacement engineer, as well as the costs of recruiting, hiring, and processing a new engineer. When multiplied by the number of engineers affected, these costs are quite significant for NAC.

The data indicate that NAC can take specific steps to positively influence the above outcome variables. The first

two methods deal with an individual's interpretive styles, especially skill recognition and envisioning success. One possible way to increase one's style of skill recognition (attributing successful task accomplishment to one's abilities) might include the manager pointedly observing this relationship with individual engineers after a job is performed well. Another method might be training sessions for the engineers, a sort of "awareness training". The latter method might also prove useful in improving one's ability to envision success when contemplating future projects, while managerial encouragement might also beneficially influence this interpretive style.

It appears from the data that the next most potent route to increasing intrinsic motivation is the creation of a positive branch climate. Individual questions that measured this variable suggest that anything the branch manager can do to promote an atmosphere where creativity and group support and encouragement are the culture, as well as create a challenging environment, will help to promote the type of group climate seen as being positively related to intrinsic task motivation.

Additionally, NAC might look at managerial behavior as a way to increase intrinsic task motivation in its engineers. As stated above, managers who buffer and protect the branch, (that is, they guard it against unnecessary interruptions, act as a buffer between higher and adjacent units, and stand up

for their engineers) seem to end up with engineers that have higher levels of intrinsic task motivation. Further, branch managers who make accurate, informed personnel decisions (that is, they assign tasks appropriately based on skills, recognize superior performance, and assign work equitably) also seem to have engineers with higher intrinsic task motivation. Ways to improve these managerial behaviors might start with conducting training sessions and/or making this a part of the performance appraisal system.

Finally, the data indicate that an engineer's intrinsic task motivation has a relationship with the frequency of interaction with the branch manager. Therefore, although not specifically a managerial behavior item, the branch manager might seek to interact on a frequent, regular basis with the engineers, if they are not already doing so.

C. USEFULNESS OF THE THOMAS/VELTHOUSE MODEL IN DESCRIBING AND EXPLAINING INTRINSIC TASK MOTIVATION

The findings indicate that the Thomas/Velthouse model used in this analysis does seem to provide an accurate description of relationships that exist in intrinsic task motivation. As was mentioned in Chapter IV, Thomas and Velthouse's decision to include aspects of both task purpose and activities in their model does seem to have been strongly supported by the results of this study. Meaningfulness and impact, relating to the task purpose, showed higher correlations with the outcome

variables than did choice and competence, which relate to task activities.

Among the variables believed to influence intrinsic task motivation, the interpretive styles, a major component of the Thomas/Velthouse model, were seen to have the strongest relationships, therefore lending further credibility to the Thomas/Velthouse model. Finally, the results of this study provided further evidence that the outcome measures that Tymon (1988) added to the Thomas/Velthouse model (as discussed in Chapter II) have significant relationships with measures of intrinsic task motivation and the four task assessments.

D. RECOMMENDATIONS FOR FURTHER RESEARCH

As noted above, the task assessments of meaningfulness and impact appeared to be most important to engineers in this study. Of these two task assessments, this study raises the most questions about the sources of task meaningfulness for engineers. Analysis of the split-half correlations within each branch, as shown in Table 4.4, indicate that only meaningfulness is significantly a group phenomenon; the other three task assessments appear to be individual in nature. However, the independent variables with the highest correlation with meaningfulness were the interpretive styles of skill recognition and envisioning success, which are individual in nature. Positive climate, a group phenomenon, does relate to meaningfulness, but only explains 4.4% of it.

Managerial behavior, which is seen as affecting the group, relates to impact and choice, not meaningfulness. Further study is therefore recommended to try to determine what additional source variables that are considered group in nature are related to meaningfulness.

One possible suggestion is to look at the situational variables suggested in the Hackman and Oldham (1980) model. These situational variables are task significance, task identity, and skill variety. Task significance, for example, deals with the perceived importance of the task, whether one views one's work as making a difference. It is assumed that if one views working on a new military project, for example, as more important than a project for internal customers, then the former should have a higher degree of intrinsic motivation associated with it. It is suggested that further research, in addition to investigating Hackman and Oldham's variables, try to determine additional sources of this very important task assessment. A possible method would be to conduct in-depth interviews with the engineers, looking for what meaningfulness means to them.

Another area for further research is the relationship of the situational variables to intrinsic task motivation. Four variables were used in this study, G.S. level, tenure in branch, frequency of interaction with the branch manager, and interdependence on other engineers in the branch. Of these, only frequency of interaction with the branch manager had a

highly significant ($p \leq .001$) correlation with intrinsic task motivation (and with the task assessment of choice). Other less significant correlations did occur, as displayed in Tables 4.10 and 4.11. These variables were not a primary focus of this study, but were examined after results indicated that differences in individual's situations might explain much of intrinsic task motivation (as indicated in Table 4.4). Even though most of the relationships shown are not highly significant in this study, they may provide a lead to stronger relationships. Further, additional situational variables might be added in order to find other ways of explaining intrinsic task motivation.

APPENDIX A

NAC ENGINEERING MANAGEMENT SURVEY:

FORM FOR ENGINEERS OR SCIENTISTS

This appendix contains a copy of the questionnaire administered to engineers and scientists at the Naval Avionics Center.

NAC ENGINEERING MANAGEMENT SURVEY:

FORM FOR ENGINEERS OR SCIENTISTS

This questionnaire is part of a study of engineering management and motivation throughout 800 and 900. It will take 30 or 40 minutes to complete. The main purpose of the study is to identify different patterns or "styles" of engineering management and to see which patterns are most effective at NAC.

This questionnaire was custom-designed for NAC. A few questions are standard questions that have been used to study management in other settings. But most of the items address things that were suggested as being especially important at NAC by the engineers and managers we have interviewed.

This study will allow us to test their perceptions by getting everyone's input on what managers are actually doing and on the consequences of their behaviors.

These questionnaires are anonymous and confidential. After you have completed yours, please place it in the attached envelope, seal the envelope, and send it to CODE 531. We will analyze the data and prepare a report of findings. That report will be distributed widely within 800 and 900 and will also be used by the Civilian Personnel Office as an input to management training. We will also provide individual branch and division managers with confidential feedback on the average responses of their subordinates to the items of the questionnaire.

Please take this opportunity to provide your data on what is or is not effective, and to provide this anonymous and confidential feedback to your branch manager.

Professor Kenneth W. Thomas
Department of Administrative Sciences
Naval Postgraduate School

Professor Susan Hocevar
Department of Administrative Sciences
Naval Postgraduate School

ENGINEERING MANAGEMENT SURVEY

GENERAL INSTRUCTIONS

Most of the questions in this survey ask you to indicate the degree to which you agree or disagree with a statement. Below are a few sample statements:

	Strongly Disagree						Strongly Agree
1. The weather in this area is hot during the summer.	[1]	[2]	[3]	[4]	[5]	[6]	[7] ✓
2. People in small towns work harder than people who work in the city.	[1]	[2]	[3] ✓	[4]	[5]	[6]	[7]
3. The quality of products in the United States is decreasing.	[1]	[2] ✓	[3]	[4]	[5]	[6]	[7]

For the first sample statement the person strongly agreed with the statement. For the second sample statement, the person disagreed a little. For the third sample statement, the person tended to disagree.

SECTION 1 - BACKGROUND INFORMATION

The following information is needed to help us with statistical analyses of the data.

All of your responses are strictly confidential. Individual responses will not be seen by anyone at NAC. We appreciate your help in providing this important information.

PLEASE ANSWER EACH OF THE QUESTIONS BELOW BY CHECKING THE NUMBER NEXT TO THE DESCRIPTION WHICH IS MOST TRUE OR BY WRITING IN THE CORRECT INFORMATION.

1. Are you - (Check one)

   [1] Female

   [2] Male

2. How old were you on your last birthday?

   ------ years

3. What is your GS level?

   ------

4. What branch are you in? (Write in branch number)

   ------

5. How long have you been in this branch?

   ------ years and ------ months

6. How long have you been working with your current branch manager?

   ------ years and ------ months

7. Are you currently acting as a project engineer?

   [1] No

   [2] Yes

8. Which one of the following best describes the project(s) you are working on now?

[1] Basic research:

Work of a general nature intended to apply to a broad range of applications or to the development of new knowledge about an area.

[2] Applied research:

Work involving basic knowledge for the solution of a particular problem. The creation and evaluation of new concepts or components but not development for operational use.

[3] Development:

The combination of existing feasible concepts, perhaps with new knowledge, to provide a distinctly new product or process. The application of known facts and theory to solve a particular problem through exploratory study, design, and testing of new components or systems.

[4] Technical Service:

Cost/performance improvements to existing products, processes, or systems. Recombination, modification, and testing of systems using existing knowledge. Opening new markets for existing products.

9. On the average, how often do you have work-related interactions with your branch manager (larger meetings as well as one-on-one talks)?

[1] Less than once a month
[2] Once or twice a month
[3] Once a week
[4] Two or three times per week
[5] Once a day
[6] More than once a day

Indicate how much you agree or disagree with the following two statements.

10. In my branch, engineers or scientists need to interact frequently with the branch manager in order to do their job well.

Strongly Disagree						Strongly Agree
[1]	[2]	[3]	[4]	[5]	[6]	[7]

11. In my branch, engineers or scientists need to interact frequently with other engineers and scientists in the branch in order to do their jobs well.

Strongly Disagree						Strongly Agree
[1]	[2]	[3]	[4]	[5]	[6]	[7]

SECTION 2 – BRANCH MANAGER'S BEHAVIOR

This section asks for your perceptions of a number of things which your branch manager may do. Indicate how much you agree or disagree with each statement. Some of these statements may sound similar, but it is important that you respond to each one.

My branch manager ...

	Strongly Disagree						Strongly Agree
1. Has enough technical expertise.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
2. Is willing to take risks	[1]	[2]	[3]	[4]	[5]	[6]	[7]
3. Is straightforward and candid.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
4. Is critical of subordinates' efforts.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
5. Shows us how our activities fit into the overall mission of the center.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
6. Promotes teamwork within our branch.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
7. Has a vision of exciting possibilities for our branch.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
8. Is a micro-manager.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
9. Is sensitive to my needs and desires.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
10. Lets us know the significance of what we are doing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
11. Looks for improved ways of doing things.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
12. Is more strongly focused on meeting deadlines and other requirements than on doing the job well.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

My branch manager ...

	Strongly Disagree						Strongly Agree
13. Encourages subordinates to participate in making important decisions.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
14. Stands up for subordinates when it counts.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
15. Insists on high standards of performance	[1]	[2]	[3]	[4]	[5]	[6]	[7]
16. Is accessible to subordinates.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
17. Makes promotion recommendations based on individual performance.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
18. Guides subordinates' career development.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
19. Keeps us on schedule.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
20. Protects the branch from unnecessary hassles and interruptions.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
21. Conveys a sense of urgency about meeting the demands placed on our branch.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
22. Assigns tasks and projects appropriately, based on subordinates' skills and limitations.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
23. Encourages subordinates to take risks.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
24. Listens to subordinates.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
25. Assigns career development opportunities based on individual performance.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
26. Encourages us to find ways to improve quality.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
27. Is too busy to talk with subordinates.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

My branch manager ...

	Strongly Disagree						Strongly Agree
28. Is a "hands-off" manager.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
29. Gives recognition for superior performance.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
30. Treats me with respect.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
31. Keeps us informed of the long-term aims of the organization.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
32. Is aggressive in getting things done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
33. Emphasizes cooperation between branch members.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
34. Seems to be looking for mistakes we might make.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
35. Gives subordinates an inspiring idea of what is possible.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
36. Emphasizes the importance of meeting customers' needs.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
37. Runs interference for us in dealing with top management and other units.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
38. Pushes ahead in a positive manner.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
39. Assigns work equitably.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
40. Is willing to admit mistakes.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
41. In all, I am satisfied with my branch manager.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

My branch manager ...

	Strongly Disagree						Strongly Agree
42. Assigns desirable tasks based on individual performance.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
43. Doesn't "spoon-feed" us with too much guidance on how to do things.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
44. Views mistakes as a learning experience and doesn't hold them against you.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
45. Drops by to talk with me.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
46. Worries about what might go wrong.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
47. Is impatient about ideas or questions which deviate from things he/she believes must be done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
48. Genuinely cares about subordinates.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
49. Provides a sense of direction for this branch.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
50. Is able to prioritize tasks effectively.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
51. Implements subordinates' ideas.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
52. Keeps us informed of possible surprises/roadblocks.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
53. Complains about what is wrong around here.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
54. Always seems to be pushing us.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
55. In all, I am satisfied that the methods of leadership used by my branch manager are the right ones for getting my group's job done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

My branch manager ...

	Strongly Disagree						Strongly Agree
56. Has confidence in subordinates.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
57. Provides helpful feedback.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
58. Helps us develop ideas.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
59. Knows how to work with others outside our branch to get things done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
60. Trusts subordinates.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
61. Gives subordinates clear guidance.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
62. Mostly tells us why things <u>can't</u> be done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
63. Tends to overreact to problems or setbacks.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
64. Is an effective teacher.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
65. Helps us feel good about our achievements.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
66. Gives us credit for our successes.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

67. Please provide an <u>overall</u> rating of the effectiveness of your branch manager.

Not at all Effective		Somewhat Effective		Quite Effective		Extremely Effective
[1]	[2]	[3]	[4]	[5]	[6]	[7]

SECTION 3 - BRANCH CLIMATE

This section asks you about what happens when you interact with other engineers or scientists within your branch. Indicate how much you agree or disagree with each statement.

In this branch ...

	Strongly Disagree						Strongly Agree
1. People often seem stressed.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
2. Everyone's opinions get listened to.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
3. There are feelings among members which tend to pull the group apart.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
4. We get along with each other very well.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
5. When one of us does well, the others are honestly happy for him or her.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
6. There is an atmosphere of confidence.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
7. People are sometimes inflexible about reexamining their assumptions on what they are doing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
8. People are strongly committed to meeting project deadlines.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
9. We are ready to defend each other from criticism by outsiders.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
10. People are preoccupied with whether or not they are accomplishing what they need to.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

In this branch ...

	Strongly Disagree						Strongly Agree
11. People help you feel good about your abilities.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
12. Members tell each other the way we are feeling.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
13. There is constant bickering.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
14. People are receptive to creative new ways of looking at our tasks.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
15. People are able to work at a natural work pace.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
16. Members have a "can-do" attitude toward their job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
17. People are strongly committed to doing work of high technical quality.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
18. We help each other on the job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
19. We give each other recognition for good work.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
20. My co-workers are afraid to express their real views.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
21. Some of the people I work with have no respect for others.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
22. It is easy for people to change directions to take advantage of new opportunities they encounter.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

In this branch ...

	Strongly Disagree						Strongly Agree
23. People work under a strong sense of pressure.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
24. The branch is able to respond to unusual demands placed upon it.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
25. There is strong committment to satisfying customers' wishes.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
26. People often acknowledge one another for their efforts.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
27. We stick together.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
28. If we have a decision to make, everyone is involved in making it.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
29. People who offer new ideas are likely to get "clobbered".	[1]	[2]	[3]	[4]	[5]	[6]	[7]
30. There is a sense of urgency about getting things done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

SECTION 4 - FEELINGS ABOUT WORK

This section asks you about different types of feelings you may have concerning your work. Knowing these feelings will help us evaluate some aspects of management effectiveness at NAC.

On this job ...

	Strongly Disagree						Strongly Agree
1. I care about what I am doing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
2. I am developing my own special abilities.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
3. My opinion of myself goes up when I do this job well.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
4. I often think about quitting.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
5. My job measures up to the sort of of job I wanted when I took it.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
6. I am proficient at what I am doing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
7. I have a sense that things are moving along well.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
8. I feel free to select different paths or approaches in my work.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
9. I am getting results.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
10. I am good at my job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
11. My projects are going well.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
12. I am growing and developing professionally on this job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

On this job ...

	Strongly Disagree						Strongly Agree
13. I feel a great sense of personal satisfaction when I do this job well.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
14. I will probably look for a new job in the next year.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
15. I am generally satisfied with the kind of work I do on this job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
16. I have felt fidgety or nervous as a result of my job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
17. I often feel weak all over.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
18. How I go about doing things is up to me.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
19. My work serves a valuable purpose.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
20. I am performing competently.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
21. I am learning useful new things in my job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
22. I feel bad and unhappy when I discover that I have performed poorly on this job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
23. If I had a different job, my health would probably improve.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
24. Generally speaking, I am very satisfied with this job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
25. My projects are significant to me.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

On this job ...

	Strongly Disagree						Strongly Agree
26. I have a sense of freedom in what I am doing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
27. I am affecting the course things take.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
28. The work I am doing is important.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
29. I am doing my work capably.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
30. I am determining what I do on my job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
31. What I am trying to accomplish is meaningful to me.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
32. I feel I have a lot of latitude in what I am doing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
33. I am demonstrating my abilities.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
34. I am exercising a lot of choice in what I do.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
35. I am skillful in my work.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
36. I am doing worthwhile things.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
37. I am having an impact.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
38. I am accomplishing my objectives.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
39. I seem to tire quickly.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
40. My own feelings generally are <u>not</u> affected much one way or the other by how well I do on this job.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

41. How likely is it that you will actively look for a new job in the next year?

Not at all Likely		Somewhat Likely		Quite Likely		Extremely Likely
[1]	[2]	[3]	[4]	[5]	[6]	[7]

42. Knowing what you know now, if you had to decide all over again whether to take the job you now have, what would you decide?

[1] I would definitely not take the job again.

[2] I would probably not take the job again.

[3] I am not sure if I would take the job again.

[4] I would probably take the job again.

[5] I would definitely take the job again.

43. Most people have days when they feel tired or worn out during a good part of the day. How often does this happen to you?

[1] Very rarely or never.

[2] About 5% of the time.

[3] About 10% of the time.

[4] About 25% of the time.

[5] About 50% of the time.

[6] More than 50% of the time.

44. How often do you feel nervous, tense, or edgy while on the job?

[1] Very rarely or never.

[2] About 5% of the time.

[3] About 10% of the time.

[4] About 25% of the time.

[5] About 50% of the time.

[6] More than 50% of the time.

SECTION 5 - WAYS OF THINKING

This section asks you about different patterns or tendencies that may exist in your thinking. We have learned from previous research that knowing these ways of thinking can better help us interpret your answers to other questions in this survey and better understand what is occurring in your branch. Please answer these questions candidly. The only right answer is what you honestly feel.

	Strongly Disagree						Strongly Agree
1. When something I do is successful, I see it as evidence of my capabilities.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
2. I usually have a clear vision, in my mind's eye, of things working out well.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
3. I tend to worry about whether things will go wrong.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
4. I often find myself turning other people's requests of me into mandates or obligations.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
5. When things are going well, it is easy for me to recognize how my own skills have contributed to it.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
6. I often find myself visualizing the attainment of outcomes I seek.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
7. When considering a course of action that would be a good idea, I often begin to treat it as something I have to do.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
8. Setbacks often cause me to feel incompetent.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

	Strongly Disagree						Strongly Agree
9. When on a project with others, I seem more likely than them to view the project as something which needs to be done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
10. I frequently find myself with mental images of succeeding.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
11. I generally give myself credit for my successes.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
12. I often focus on the potential for failure when thinking about the future.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
13. I tend to be the kind of person who keeps emphasizing to myself how necessary it is to complete my tasks.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
14. When something goes wrong, my first reaction is often to exaggerate how bad it is – to see it as a disaster.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
15. I often form a picture in my mind of succeeding.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
16. I let myself feel competent when things are getting done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
17. When things are going badly, I begin to think that something is wrong with me.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
18. I have no trouble seeing the role of my abilities in the progress that I make.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
19. I often seem to create demands and requirements for myself.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

	Strongly Disagree						Strongly Agree
20. I tend to envision the accomplishment of goals I am pursuing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
21. When people give me feedback which is both positive and negative, I tend to overlook the positive and experience it as negative.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
22. I often interpret guidelines as though they were imperatives.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
23. I often imagine myself realizing a goal.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
24. When I accomplish something, I tend to see my talents as an important reason for it.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
25. It seems as though I am continually reminding myself of what has to be done.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
26. In my own mind, things that I decide I want to do seem to turn into things that I must do.	[1]	[2]	[3]	[4]	[5]	[6]	[7]

THANK YOU FOR TAKING THE TIME TO ANSWER THESE QUESTIONS. PLEASE PUT THIS COMPLETED QUESTIONNAIRE IN THE ATTACHED ENVELOPE, SEAL IT, AND SEND IT TO "CODE 531."

APPENDIX B

QUESTIONNAIRE ITEMS THAT MEASURED THE TASK ASSESSMENTS AND OTHER VARIABLES

This appendix contains a listing of the questionnaire items by number that were combined to measure the task assessments

(1) Task Assessments

(a) Choice

F8, F18, F26, F30, F32, F34

(b) Competence

F6, F10, F20, F29, F35

(c) Impact

F7, F9, F11, F38

(d) Meaningfulness

F1, F19, F25, F28, F31, F36

(Note: The F indicates that these items are from Section 4 -- Feelings About Work section of the questionnaire and the number indicates the particular item in that section.)

(2) Overall Evaluation of Managerial Effectiveness

MB41, MB55, MB67

(Note: The MB indicates that these items are from Section 2 -- Branch Manager's Behavior section of the questionnaire and the number indicates the particular item in that section.)

(3) Job Satisfaction

F5, F15, F24, F42

(4) Positive Work Climate

C28, C20, C2, C29, C9, C18, C4, C27, C5, C19, C11, C26, C8, C25, C17, C16, C6, C24, C22, C14

(Note: The C indicates that these items are from Section 3 -- Branch Climate section of the questionnaire and the number indicates the particular item in that section.)

(5) *Group Problems*

C3, C21, C13, C7

(6) Pressure

C1, C10, C15, C23, C30

(7) Intention to Leave

F4, F14, F41

(8) Stress

F17, F16, F23, F39, F43, F44

(9) Professional Development

F2, F12, F21

APPENDIX C

MEANS, STANDARD DEVIATIONS AND INTERNAL CONSISTENCIES FOR SCALED VARIABLES USED IN THIS STUDY (n=372)

	Mean Score	Standard Deviation	Internal Consistency (α)
1. TASK ASSESSMENTS			
Choice	5.20	1.09	.92
Competence	5.70	.93	.94
Impact	5.04	1.13	.88
Meaningfulness	5.40	1.16	.94
Overall ITM	5.34	.89	.95
2. OUTCOME VARIABLES			
Job Satisfaction	4.46	1.30	.90
Turnover Intentions	3.06	1.70	.88
Stress	2.82	1.17	.85
Professional Development	5.23	1.22	.86
3. SOURCE VARIABLES			
a) BRANCH LEVEL			
Overall Managerial Effectiveness	4.99	1.46	.94
Group Problems	3.48	1.21	.77
Positive Branch Climate	4.82	.91	.94
Pressure in Branch	3.75	.88	.64
b) INTERPRETIVE STYLES			
Deficiency Focusing	3.33	1.05	.83
Envisioning Success	4.92	.96	.90
Skill Recognition	5.21	.81	.84

Note: This table includes variables composed of multiple items. Internal consistencies are based on intercorrelations among items measuring the same variable. All variables in this table are ratings by individual engineers, including branch level vaiables. Branch level variables are averaged across engineers in a branch in some analyses in Chapter 4, as explained in the text.

APPENDIX D

TOTAL INTERCORRELATION MATRIX OF SCALED VARIABLES USED IN THIS STUDY (n=372)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A. TASK ASSESSMENTS																
1. Choice		.46	.54	.54	.77	.54	.56	-.32	-.33	-.11	.26	.27	.43	-.27	-.19	.38
2. Competence			.67	.58	.80	.49	.52	-.33	-.26	-.33	.37	.54	.31	-.12	-.13	.21
3. Impact				.70	.88	.69	.66	-.51	-.50	-.24	.39	.41	.47	-.27	-.20	.37
4. Meaning-fulness					.86	.78	.73	-.40	-.51	-.14	.36	.34	.39	-.17	-.06	.23
5. Overall ITM						.76	.75	-.47	-.49	-.24	.42	.46	.49	-.25	-.17	.36
B. OUTCOME VARIABLES																
6. Job Satisfaction							.74	-.45	-.60	-.09	.34	.30	.45	-.26	-.18	.34
7. Professional Development								-.37	-.45	-.15	.33	.34	.40	-.24	-.15	.27
8. Stress									.42	.48	-.27	-.26	-.37	.32	.37	-.17
9. Turnover Intentions										.11	-.08	-.10	-.39	.25	.15	-.39

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C. SOURCE VARIABLES																
--INTERPRETIVE STYLES																
10. Deficiency Focusing											-.26	-.32	-.12	.15	.24	-.06
11. Envisioning Success												.60	.13	-.01	-.04	-.09
12. Skill Recognition													.24	-.10	-.10	-.09
--BRANCH LEVEL																
13. Positive Climate														-.66	-.19	.35
14. Group Problems															.33	-.24
15. Pressure																-.09
16. Overall Evaluation of Managerial Effectiveness																

Note: All variables in this table are ratings by individual engineers, including branch level variables. Branch level variables are averaged across engineers in a branch in some analyses in Chapter 4, as explained in the text. All correlations are shown. Correlation coefficients with an absolute value of .17 or more are significant at $p \leq .01$, and .10 or more at $p \leq .05$.

APPENDIX E

STATISTICS FOR INDIVIDUAL QUESTIONS MEASURING MANAGERIAL BEHAVIOR: MEANS, STANDARD DEVATIONS, AND SPLIT-HALF RELIABILITIES WITHIN BRANCHES

Question #	Mean	Std. Dev.	Reliabilities		
			Split-Half I	Split-Half II	Adjusted Alpha
MB 1	4.96	1.55	0.57	0.57	0.73
MB 2	4.67	1.55	0.53	0.48	0.67
MB 3	5.38	1.56	0.69	0.66	0.80
MB 4	3.02	1.47	0.34	0.33	0.50
MB 5	4.05	1.49	0.41	0.43	0.59
MB 6	4.81	1.52	0.58	0.57	0.73
MB 7	4.52	1.60	0.34	0.37	0.52
MB 8	2.67	1.60	0.44	0.46	0.62
MB 9	4.83	1.49	0.53	0.51	0.68
MB 10	4.49	1.40	0.46	0.45	0.62
MB 11	4.81	1.44	0.30	0.33	0.47
MB 12	3.05	1.35	0.39	0.40	0.56
MB 13	4.93	1.43	0.37	0.40	0.55
MB 14	5.10	1.52	0.66	0.66	0.80
MB 15	4.93	1.16	0.48	0.45	0.63
MB 16	5.39	1.51	0.44	0.42	0.60
MB 17	4.66	1.58	0.52	0.52	0.68
MB 18	4.34	1.48	0.38	0.31	0.51
MB 19	4.31	1.22	0.34	0.29	0.47
MB 20	4.43	1.44	0.69	0.64	0.80
MB 21	4.67	1.21	0.33	0.32	0.48
MB 22	4.65	1.41	0.59	0.53	0.71
MB 23	4.30	1.25	0.44	0.39	0.58
MB 24	5.46	1.41	0.42	0.40	0.58
MB 25	4.34	1.33	0.54	0.47	0.67
MB 26	4.69	1.25	0.43	0.41	0.59
MB 27	2.34	1.45	0.38	0.33	0.52
MB 28	4.58	1.63	-0.08	-0.09	--
MB 29	4.93	1.48	0.46	0.48	0.64
MB 30	5.77	1.26	0.41	0.35	0.55
MB 31	4.59	1.45	0.43	0.40	0.58
MB 32	4.76	1.42	0.45	0.43	0.61
MB 33	5.09	1.30	0.38	0.33	0.52
MB 34	2.72	1.46	0.55	0.55	0.71
MB 35	4.16	1.31	0.32	0.32	0.48

Question #	Mean	Std. Dev.	Reliabilities		
			Split-Half I	Split-Half II	Adjusted Alpha
MB 36	5.20	1.18	0.24	0.22	0.36
MB 37	4.77	1.51	0.47	0.45	0.62
MB 38	5.16	1.26	0.42	0.39	0.57
MB 39	4.69	1.32	0.40	0.41	0.57
MB 40	5.13	1.32	0.43	0.41	0.59
MB 42	4.36	1.20	0.41	0.38	0.56
MB 43	5.54	1.17	0.32	0.29	0.46
MB 44	5.29	1.13	0.40	0.34	0.54
MB 45	4.58	1.58	0.39	0.34	0.53
MB 46	3.95	1.38	0.23	0.23	0.37
MB 47	3.26	1.48	0.17	0.24	0.33
MB 48	5.25	1.41	0.58	0.60	0.74
MB 49	4.62	1.51	0.56	0.56	0.72
MB 50	4.84	1.29	0.51	0.52	0.68
MB 51	4.82	1.22	0.40	0.41	0.57
MB 52	4.78	1.35	0.57	0.49	0.69
MB 53	2.92	1.48	0.07	0.10	0.15
MB 54	3.07	1.25	0.24	0.25	0.39
MB 56	5.39	1.15	0.38	0.40	0.56
MB 57	4.96	1.38	0.52	0.47	0.66
MB 58	4.61	1.37	0.54	0.53	0.69
MB 59	5.17	1.37	0.45	0.43	0.61
MB 60	5.37	1.24	0.43	0.48	0.62
MB 61	4.62	1.40	0.42	0.42	0.59
MB 62	2.55	1.37	0.31	0.29	0.46
MB 63	2.67	1.35	0.08	0.10	0.16
MB 64	4.09	1.33	0.56	0.57	0.72
MB 65	4.87	1.37	0.60	0.62	0.76
MB 66	5.14	1.45	0.45	0.47	0.62

Note: Means and standard deviations are for an individual engineer's rating of his/her manager on each question (n=365). Questions 41, 55 and 67 are omitted because they are used to calculate the engineer's overall evaluation of managerial effectiveness. Split-half reliabilities and adjusted alphas within branches were calculated using the same procedure for variables in Table 4.4, using an n of 40 branches.

APPENDIX F

CORRELATIONS OF TASK ASSESSMENTS
WITH MEAN MANAGERIAL BEHAVIOR VARIABLES

Question #	Question Description	--- Choice --		--Competence-		--- Impact --		-Meaningfulne		---Intrintv--	
		Corr.	P-value	Corr.	P-value	Corr.	P-value	Corr.	P-value	Corr.	P-value
1	enough technical expertise	0.15	0.004	0.08	0.122	0.11	0.037	0.09	0.095	0.14	0.010
2	willing to take risks	0.23	0.000	0.11	0.032	0.12	0.028	0.12	0.018	0.19	0.000
3	straightforward and candid	0.16	0.002	0.06	0.286	0.08	0.128	0.09	0.091	0.13	0.012
4	critical of subordinates' efforts	-0.09	0.103	-0.15	0.005	-0.10	0.057	-0.07	0.177	-0.13	0.016
5	shows how activities fit into overall mission	0.18	0.001	0.08	0.136	0.13	0.012	0.11	0.042	0.17	0.002
6	promotes teamwork	0.20	0.000	0.13	0.016	0.21	0.000	0.15	0.005	0.22	0.000
7	vision of branch possibilities	0.16	0.002	0.07	0.165	0.15	0.005	0.10	0.051	0.16	0.002
8	Is a micro-manager	-0.17	0.001	-0.10	0.070	-0.12	0.024	-0.10	0.061	-0.15	0.004
9	sensitive to needs and desires	0.19	0.000	0.11	0.041	0.18	0.001	0.10	0.063	0.18	0.000
10	advises of task significance	0.23	0.000	0.13	0.012	0.19	0.000	0.14	0.008	0.22	0.000
11	looks for improved methods	0.17	0.001	0.10	0.054	0.13	0.011	0.09	0.087	0.16	0.002
12	deadline oriented vs. job quality	-0.11	0.037	-0.04	0.491	-0.07	0.180	-0.04	0.446	-0.09	0.093
13	encourage participation in decision making	0.21	0.000	0.13	0.013	0.17	0.001	0.14	0.008	0.21	0.000
14	stands up for subordinates	0.26	0.000	0.17	0.001	0.21	0.000	0.20	0.000	0.27	0.000
15	high performance standards	0.15	0.005	0.07	0.164	0.09	0.076	0.10	0.065	0.14	0.010
16	accessible to subordinates	0.13	0.011	0.13	0.013	0.12	0.019	0.04	0.425	0.13	0.014
17	recommends promotions based on performance	0.23	0.000	0.12	0.019	0.18	0.000	0.19	0.000	0.23	0.000
18	guides subordinates' career development	0.20	0.000	0.11	0.039	0.21	0.000	0.18	0.001	0.22	0.000
19	keeps branch on schedule	0.21	0.000	0.18	0.000	0.21	0.000	0.15	0.005	0.24	0.000
20	shields branch from interruptions/hassles	0.25	0.000	0.18	0.001	0.23	0.000	0.17	0.001	0.26	0.000
21	conveys sense of urgency about meeting deadlines	0.19	0.000	0.14	0.007	0.16	0.002	0.12	0.024	0.19	0.000
22	assigns tasks fairly based on skills	0.23	0.000	0.18	0.001	0.23	0.000	0.19	0.000	0.27	0.000
23	encourages risk taking	0.26	0.000	0.15	0.004	0.19	0.000	0.16	0.003	0.24	0.000
24	listens to subordinates	0.18	0.001	0.13	0.011	0.16	0.002	0.11	0.032	0.19	0.000
25	career development based on performance	0.17	0.001	0.09	0.072	0.18	0.000	0.21	0.000	0.22	0.000
26	encourages new ways of quality improvement	0.20	0.000	0.12	0.018	0.20	0.000	0.14	0.008	0.21	0.000
27	too busy to talk with subordinates	-0.14	0.009	-0.12	0.020	-0.12	0.022	-0.02	0.748	-0.12	0.020
28	is a "hands-off" manager	0.08	0.148	0.03	0.511	0.07	0.169	0.02	0.704	0.06	0.290
29	recognizes superior performance	0.25	0.000	0.13	0.014	0.19	0.000	0.22	0.000	0.26	0.000
30	treats me with respect	0.24	0.000	0.19	0.000	0.21	0.000	0.19	0.000	0.26	0.000
31	informs branch of long-term goals	0.19	0.000	0.13	0.011	0.19	0.000	0.16	0.003	0.21	0.000

Question #	Question Description	--- Choice --		--Competence-		--- Impact --		-Meaningfulne		---Intrintv--	
		Corr.	P-value	Corr.	P-value	Corr.	P-value	Corr.	P-value	Corr.	P-value
32	aggressive in task accomplishment	0.22	0.000	0.10	0.053	0.12	0.018	0.13	0.012	0.18	0.000
33	emphasizes intra-branch cooperation	0.19	0.000	0.09	0.093	0.17	0.001	0.12	0.023	0.19	0.000
34	looks for potential mistakes	-0.22	0.000	-0.19	0.000	-0.18	0.001	-0.14	0.007	-0.23	0.000
35	provides inspiring ideas of possibilities	0.21	0.000	0.13	0.013	0.19	0.000	0.17	0.002	0.23	0.000
36	stresses meeting customers' needs	0.20	0.000	0.18	0.001	0.16	0.002	0.10	0.048	0.21	0.000
37	buffers between higher and adjacent units	0.20	0.000	0.18	0.001	0.16	0.002	0.10	0.048	0.21	0.000
38	pushes ahead in a positive manner	0.28	0.000	0.19	0.000	0.26	0.000	0.20	0.000	0.29	0.000
39	assigns work equitably	0.19	0.000	0.11	0.036	0.16	0.003	0.11	0.036	0.18	0.000
40	willing to admit mistakes	0.25	0.000	0.15	0.003	0.22	0.000	0.16	0.002	0.25	0.000
42	assigns desirable tasks based on performance	0.20	0.000	0.10	0.050	0.17	0.001	0.19	0.000	0.22	0.000
43	doesn't overdo guidance provided	0.17	0.001	0.11	0.038	0.13	0.012	0.12	0.027	0.17	0.001
44	sees mistakes as learning experiences; no bad mark	0.25	0.000	0.15	0.004	0.18	0.000	0.16	0.002	0.23	0.000
45	drops by to talk with me	0.21	0.000	0.15	0.005	0.21	0.000	0.11	0.029	0.21	0.000
46	worries about what might go wrong	-0.04	0.413	-0.02	0.712	0.03	0.541	0.01	0.913	-0.01	0.925
47	impatient re: ideas/questions that deviate from tasks	-0.13	0.012	-0.08	0.110	-0.12	0.017	-0.03	0.528	-0.12	0.022
48	genuinely cares about subordinates	0.16	0.002	0.09	0.092	0.14	0.009	0.11	0.040	0.16	0.002
49	provides a sense of direction for this branch	0.21	0.000	0.09	0.091	0.15	0.003	0.12	0.022	0.19	0.000
50	prioritizes task effectively	0.19	0.000	0.12	0.028	0.13	0.014	0.13	0.014	0.18	0.000
51	implements subordinates' ideas	0.19	0.000	0.12	0.028	0.13	0.014	0.13	0.014	0.18	0.000
52	informs of possible suprises/roadblocks	0.25	0.000	0.13	0.017	0.20	0.000	0.15	0.003	0.23	0.000
53	complains about what is wrong	0.17	0.002	0.09	0.091	0.15	0.003	0.13	0.012	0.18	0.001
54	always seems to be pushing us	0.06	0.219	-0.01	0.897	0.05	0.341	0.05	0.382	0.05	0.305
56	has confidence in subordinates	0.21	0.000	0.12	0.018	0.17	0.001	0.14	0.006	0.21	0.000
57	provides helpful feedback	0.22	0.000	0.15	0.005	0.18	0.000	0.17	0.001	0.24	0.000
58	helps us develop ideas	0.20	0.000	0.12	0.023	0.17	0.001	0.14	0.008	0.21	0.000
59	knows how to work with others outside our branch	0.18	0.000	0.11	0.031	0.15	0.005	0.11	0.044	0.17	0.001
60	trusts subordinates	0.19	0.000	0.12	0.024	0.18	0.001	0.14	0.007	0.20	0.000
61	gives subordinates clear guidance	0.24	0.000	0.13	0.013	0.18	0.000	0.15	0.004	0.22	0.000
62	mostly tells us why things can't be done	-0.17	0.001	-0.13	0.014	-0.10	0.064	-0.10	0.047	-0.16	0.002
63	tends to overreact to problems or setbacks	-0.14	0.009	-0.07	0.156	-0.07	0.163	-0.04	0.447	-0.11	0.040
64	is an effective teacher	0.19	0.000	0.12	0.028	0.19	0.000	0.13	0.014	0.20	0.000
65	helps us feel good about our achievements	0.21	0.000	0.13	0.012	0.21	0.000	0.15	0.005	0.22	0.000
66	gives us credit for our successes	0.24	0.000	0.12	0.023	0.21	0.000	0.18	0.000	0.24	0.000

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